



ABINGDON

KS3 Science (Year 7)

YEAR GROUP/Stage: Year 7		SUBJECT AREA: Science
<b>Autumn 1</b>	<b>Cells, tissues, organs and systems</b>	
Knowledge	<ul style="list-style-type: none"><li>• cells as the fundamental unit of living organisms, including how to observe, interpret and record cell structure using a light microscope</li><li>• the functions of the cell wall, cell membrane, cytoplasm, nucleus, vacuole, mitochondria and chloroplasts</li><li>• the similarities and differences between plant and animal cells</li><li>• the hierarchical organisation of multicellular organisms: from cells to tissues to organs to systems to organisms.</li></ul>	
Skills	<ul style="list-style-type: none"><li>• use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety (using a light microscope and preparing light microscope slides).</li></ul>	
Vocabulary	hazard safety coverslip magnify microscope objective lens slide specimen stage stain eye piece lens fine focusing wheel coarse focusing wheel focus image	



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	magnification
<b>Autumn 1</b>	<b>Mixtures and separation</b>
Knowledge	<p>This unit focuses on the aim to 'equip students with the scientific knowledge required to understand the uses and implications of science, today and for the future'.</p> <ul style="list-style-type: none"><li>• reviewing and expanding on the concepts of mixtures, sieving and filtering from KS2. Basic knowledge of the states of matter, mixtures and separation methods of sieving and filtration is explored.</li><li>• solutions as a specific type of mixture, how the solubility of salts is affected by the temperature of the solution.</li><li>• hazards, risks and safety in the lab, particularly in relation to using a Bunsen burner for heating and carrying out evaporation to dryness of a salt solution</li><li>• Evaporation, using the context of producing table salt from brine, is looked at, with the introduction of boiling and boiling points.</li><li>• chromatography as a way of identifying the substances within mixtures.</li><li>• distillation as one example of desalination, in order to produce drinking water from salty water.</li></ul>
Skills	To demonstrate simple techniques for separating mixtures, including: filtration, evaporation, evaporation, distillation and chromatography.
Vocabulary	Safety hazard Bunsen burner separate evaporation filter chromatography boil distillation risks



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	mixture desalination
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Autumn 2	Energy
Knowledge	<ul style="list-style-type: none"><li>• comparing energy values of different foods (from labels) (kJ)</li><li>• comparing amounts of energy transferred (J, kJ, kW hour)</li><li>• fuels and energy resources</li><li>• other processes that involve energy transfer: changing motion, dropping an object, completing an electrical circuit, stretching a spring, metabolism of food, burning fuels</li><li>• energy as a quantity that can be quantified and calculated; the total energy has the same value before and after a change.</li></ul>
Skills	Heating foods and calculating energy content. <ul style="list-style-type: none"><li>• using ratios to compare experimental results.</li></ul>
	energy joule transfer renewable fossil fuel ratio power efficiency climate change
Autumn 2	Acids and alkalis
Knowledge	<ul style="list-style-type: none"><li>• chemical reactions as the rearrangement of atoms</li><li>• representing chemical reactions using formulae and using equations</li><li>• defining acids and alkalis in terms of neutralisation reactions</li></ul>



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	<ul style="list-style-type: none"><li>• the pH scale for measuring acidity/alkalinity; and indicators</li><li>• reactions of acids with alkalis to produce a salt plus water.</li></ul>
Skills	<ul style="list-style-type: none"><li>• evaluate risks.</li><li>• reading and plotting line graphs</li><li>• drawing bar charts.</li></ul>
Vocabulary	acid alkali neutralisation pH scale salt product reactant indicator hazard risk
<b>Spring 1</b>	<b>Reproduction</b>
Knowledge	<ul style="list-style-type: none"><li>• the structure and function of the male and female reproductive systems,</li><li>• menstrual cycle (without details of hormones), gametes, fertilisation, gestation and birth, to include the effect of maternal lifestyle on the foetus through the placenta.</li><li>• In addition to covering a variety of Working Scientifically statements, this unit has a focus on: • understand that scientific methods and theories develop as earlier explanations are modified to take account of new evidence and ideas, together with the importance of publishing results and peer review • ask questions and develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience</li></ul>
Skills	<ul style="list-style-type: none"><li>• make predictions using scientific knowledge and understanding</li></ul>



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	<ul style="list-style-type: none"><li>select, plan and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent, dependent and control variables, where appropriate.</li></ul>
Vocabulary	egg sperm penis vagina fertilisation gamete embryo foetus uterus umbilical cord amniotic menstrual cycle ovulation sex hormones puberty
<b>Spring 1</b>	<b>Electricity</b>
Knowledge	<ul style="list-style-type: none"><li>electric current, measured in amperes, in circuits, series and parallel circuits and the domestic ring main</li><li>current as flow of charge</li><li>potential difference, measured in volts, battery ... ratings; resistance as the ratio of potential difference (p.d.) to current measured in ohms</li><li>differences in resistance between conducting and insulating components. In addition to covering a variety of statements, this unit has a focus on:</li></ul>
Skills	<ul style="list-style-type: none"><li>using physical models to help to explain phenomena</li><li>explaining why models are used</li></ul>



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	<ul style="list-style-type: none"> <li>•planning a fair test.</li> <li>•presenting information in tables</li> <li>•classifying data as qualitative or quantitative.</li> </ul> <p>Maths skills</p> <ul style="list-style-type: none"> <li>•the use of symbols when communicating science.</li> </ul>
Vocabulary	<p>ammeter amp circuit battery cell parallel series power pack</p>
<b>Spring 2</b>	<b>Muscles and bones</b>
Knowledge	<ul style="list-style-type: none"> <li>• the structure and functions of the gas exchange system in humans, including adaptations to function • the mechanism of breathing to move air in and out of the lungs, using a pressure model to explain the movement of gases, including simple measurements of lung volume</li> <li>• the structure and functions of the human skeleton, to include support, protection, movement and making blood cells</li> <li>•biomechanics – the interaction between skeleton and muscles, including the measurement of force exerted by different muscles</li> <li>•the function of muscles and examples of antagonistic muscles</li> <li>• the impact of exercise, asthma and smoking on the human gas exchange system</li> <li>•the effects of recreational drugs (including substance misuse) on behaviour, health and life processes.</li> </ul>
Skills	<ul style="list-style-type: none"> <li>•understand that scientific methods and theories develop as earlier explanations are modified to take account of new evidence and ideas, together with the importance of publishing results and peer review</li> </ul>



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	<ul style="list-style-type: none"> <li>• ask questions and develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience.</li> <li>• information can be presented in different ways to communicate scientific ideas clearly. This includes understanding sentence construction in order to develop sentences that can be used as part of a fluid writing style that communicates information clearly.</li> </ul>
Vocabulary	backbone cartilage fixed joint A place where two or more bones meet but cannot move. flexible joint fracture ligament skeleton skull tendon vertebrae
<b>Spring 2</b>	<b>Particle model</b>
Knowledge	<ul style="list-style-type: none"> <li>• the properties of the different states of matter (solid, liquid and gas) in terms of the particle model, including gas pressure (Chemistry)</li> <li>• similarities and differences, including density differences, between solids, liquids and gases (Physics) • Brownian motion in gases (Physics)</li> <li>• differences in arrangements, in motion and in closeness of particles explaining changes of state, shape and density, the anomaly of ice– water transition.</li> </ul>
Skills	<ul style="list-style-type: none"> <li>• understand that scientific methods and theories develop as earlier explanations are modified to take account of new evidence and ideas, together with the importance of publishing results and peer review</li> <li>• make predictions using scientific knowledge and understanding</li> </ul>



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	<ul style="list-style-type: none"> <li>• present observations and data using appropriate methods, including tables and graphs.</li> <li>• how scientists use language to measure and compare by applying adjectives, comparatives and superlatives.</li> <li>converting between metres and nanometres • calculating volumes using simple formulae.</li> </ul>
Vocabulary	solid liquid gas movement particle states of matter volume
<b>Summer 1</b>	<b>Forces</b>
Knowledge	<ul style="list-style-type: none"> <li>• forces as pushes or pulls, arising from the interaction between two objects</li> <li>• using force arrows in diagrams, adding forces in one dimension, balanced and unbalanced forces</li> <li>• forces: associated with deforming objects; stretching and squashing – springs; with rubbing and friction between surfaces, with pushing things out of the way; resistance to motion of air and water</li> <li>• forces measured in newtons, measurements of stretch or compression as force is changed</li> <li>• force–extension linear relation; Hooke's Law as a special case</li> <li>• pressure measured by ratio of force over area – acting normal to any surface</li> <li>• opposing forces and equilibrium: weight held by stretched spring or supported on a compressed surface</li> <li>• forces being needed to cause objects to stop or start moving, or to change their speed or direction of motion • change depending on direction of force and its size</li> </ul>
Skills	<ul style="list-style-type: none"> <li>• the need for using standard units of measurement (including the SI system, its basic units and prefixes).</li> <li>• the use of conventions when communicating science</li> <li>• taking notes from presentations and videos (including the ordering of notes).</li> <li>• the use of conventions when communicating science</li> <li>• the SI system.</li> </ul>





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Vocabulary	contact forces non-contact forces air resistance newton upthrust mass weight water resistance
<b>Summer 1</b>	<b>Ecosystems</b>
Knowledge	<ul style="list-style-type: none"><li>• the interdependence of organisms in an ecosystem, including food webs and insect pollinated crops</li><li>• how organisms affect, and are affected by, their environment, including the accumulation of toxic materials</li><li>• differences between species</li><li>• the variation between individuals within a species being continuous or discontinuous, to include measurement and graphical representation of variation</li><li>• the variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection</li><li>• the importance of maintaining biodiversity and the use of gene banks to preserve hereditary material.</li></ul>
Skills	<ul style="list-style-type: none"><li>• the need for using standard units of measurement (including the SI system, its basic units and prefixes).</li><li>• the use of conventions when communicating science</li><li>• the use of conventions when communicating science</li><li>• the SI system.</li></ul>
Vocabulary	continuous variation discontinuous variation habitat hybrid species



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Summer 2	Atoms, elements and compounds
Knowledge	<p>the concept of a pure substance</p> <ul style="list-style-type: none"><li>• mixtures, including dissolving</li><li>• differences between atoms, elements and compounds</li><li>• chemical symbols and formulae for elements and compounds</li><li>• combustion, thermal decomposition, oxidation and displacement reactions</li><li>• the varying physical and chemical properties of different elements</li><li>• the composition of the Earth</li><li>• the difference between chemical and physical changes (physics)</li><li>• atoms and molecules as particles</li></ul>
Skills	<ul style="list-style-type: none"><li>• present observations and data using appropriate methods, including tables and graphs</li><li>• understand and use SI units and IUPAC (International Union of Pure and Applied Chemistry) chemical nomenclature.</li><li>• the use of facts and opinions to inform and persuade.</li><li>• qualitative and quantitative data</li><li>• the use of: tables; line graphs; scatter graphs; pie charts; and bar charts</li></ul>
Vocabulary	<p>chemical reaction physical change chemical change metals non-metals compounds elements atoms</p>
Summer 2	Sound
Knowledge	<ul style="list-style-type: none"><li>• waves on water as undulations which travel through water with transverse motion; these waves can be reflected, and add or cancel – superposition</li></ul>



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	<ul style="list-style-type: none"><li>• frequencies of sound waves, measured in hertz (Hz); echoes, reflection and absorption of sound</li><li>• sound needs a medium to travel, the speed of sound in air, in water, in solids</li><li>• sound produced by vibrations of objects, in loud speakers, detected by their effects on microphone diaphragm and the ear drum; sound waves are longitudinal</li><li>• auditory range of humans and animals</li><li>• pressure waves transferring energy; use for cleaning and physiotherapy by ultra-sound; waves transferring information for conversion to electrical signals by microphone.</li></ul>
Skills	<ul style="list-style-type: none"><li>• present observations and data using appropriate methods, including tables and graphs • interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions.</li><li>• ways of recalling information.</li><li>• presenting data graphically</li></ul>
Vocabulary	amplitude frequency Hertz intensity pitch vibrate vocal cords volume